

35. *Catenes, 35. *Cholula, 19, 35. *Cligenes, 35. Cymus, 34. *Davila, 35. *Dorachosa, 36. *Enciscoa, 34. Eremocoris, 20, 35. Erlacda, 35. Esuris, 36. Geocoris, 17, 18. *Gonatas, 20. Heraeus, 18, 19. Ischodemus, 19, 34. Ischnorhynchus, 19, 34. Ligyrocoris, 17, 18, 19. Lygaeus, 16, 17, 18, 34. *Mayana, 34. Myodocha, 17, 18. *Neocattarus, 19, 20, 35. *Neoninus, 19. *Nicuesa, 34. Ninus, 19. *Ninyas, 19, 34. Nysius, 34. Oncopeltus, 16, 17. Pachygrontha, 17, 34. Parema, 17, 19. Peliopelta, 36. Pèphysena, 18, 20. *Perigenes, 34. *Petissius, 35. Plociomera, 17, 19, 35. *Prytanes, 35. *Pseudopamera, 20, 35. Rhaptus, 36. Rhyparochromus, 19. Salacia, 35. *Scythinus, 35. *Sisamnes, 35. *Toonglasa, 34. Trapezonotus, 20. *Trapezuz, 20.

Pyrrhocoridae.—Arhappe, 21. Dysderus, 21. Fibrenus, 20, 21. Japetus, 21. Largus, 20. *Phaeax, 36. Pyrrhocoris, 21. *Renodaicus, 39. Stenomacra, 20. Theraneis, 21, 22.

Capsidae.—*Admetus, 25. *Annona, 26, 27, 39. *Antias, 29. *Auchus, 39. *Bibaculus, 28. Calocoris, 22, 23, 25, 37. *Calocoricora, 26, 27, 38. *Calondas, 23, 26. *Carmelus, 28, 38, 39. *Chius, 27. *Cimatlan, 27, 38. Compsocorocoris, 25, 37. Collaria, 24. *Creontiades, 23. Cylapus, 24, 36. Cyrtocapsus, 29. *Dermirata, 29, 39. Eecritotarsus, 22, 23, 26, 28, 38.

*Eioneus, 36. *Eubatas, 27. *Eurotas, 29. *Falconia, 29. *Ficinus, 39. *Florus, 29. Fulvius, 23, 27. *Fundanius, 28. *Fuscus, 29. Garganus, 25, 37. Hadromema, 22. Henicoenemis, 27. Herdonius, 36. *Horcias, 26, 27, 38. *Jacchinus, 37. *Jobertus, 36. *Jornandes, 29, 39. *Lampethusa, 29. Lopidea, 23, 37. *Lygdus, 24, 36. Lygus, 23, 26, 37. *Mala, 26. Megacoelum, 23, 37. *Minytus, 24, 36. Miris, 23, 36. *Monalocorisca, 28, 38. Monalonion, 23, 24. *Neoborus, 27, 38. *Neocapsus, 22, 38. *Neocarnus, 29. *Neofurius, 23, 28, 29. *Neoleucon, 26. *Neopropa, 26, 37. *Neosilia, 27, 29, 39. Neurocolpus, 23. Ofellus, 25. Orasus, 23. *Pandama, 26, 37. *Pappus, 25, 37. *Paracalocoris, 22, 25, 37. *Paracarnus, 28, 39. *Parachius, 27. *Parapropa, 26. *Piasus, 24. *Poeas, 37. Poecilocapsus, 22, 23, 26, 27, 37. *Proba, 25, 26. *Pseudobryocoris, 28. *Pseudocarnus, 28. *Ranzovius, 36. Resthenia, 22, 24, 25, 36, 37. *Rhasis, 38. *Spartacus, 26. *Sysinas, 23, 24, 25. *Taedia, 25. *Trygo, 29. *Vannius, 24. *Xenetus, 24. *Zacynthus, 24. *Zoilus, 25, 36. *Zosippus, 24, 36.

The figure following the name of the genus indicates the number of the plate; new genera are preceded by an (*). Of the 1109 species recorded from Central America, 49 Pentatomidae, 29 Coreidae, 22 Lygaeidae, 7 Pyrrhocoridae, and 7 Capsidae, a total of 114, are found in America north of Mexico.

NOTES ON BOMBYCID LARVAE.

BY HARRISON G. DYAR, NEW YORK.

PARORGYIA LEUCOPHAEA Abbot and Smith. 1797—A and S. Lep. ins. Ga. pl. 78.

clintonii Grote and Robinson. 1866—G and R. Proc. ent. soc. Phil., vi, 3. var. BASIFLAVA Packard.

1864—Pack., Proc. ent. soc. Phil., iii, 333. Larva (before last molt). Head shining black. Body pale yellowish, variegated with

black; a black dorsal line, interrupted on the summits of the posterior segments. Long silky white hairs, with a few black ones arise from the subventral warts. The lateral row (row iii) furnishes shorter bristly yellowish hairs; but on joints 2 and 13 gives a long pencil of black hairs. A few black hairs also overhang the head and extend from joint 13.

From the subdorsal warts on joints 2-4, 8-11 and 13 arise tufts of plumed white hairs appearing "mouldy" on the ends, intermixed with bristly yellow hairs. On joints 5, 6, 7 and 12 the warts of rows i and ii bear a series of large square black tufts, mixed with white plumed hairs especially at the sides of the tufts, where also a few bristly yellow hairs occur. The tuft on joint 7 is much less black than the others. Dorsally on joints 10 and 11 a median whitish retractile tubercle with flattened top.

Last stage.—Head black, whitish above the mouth. Body pale whitish with a yellowish tinge, shaded, marked diffusely with black; a dorsal and a stigmatal band indicated. Two long, black pencils of hairs on joints 2 and 13 as in the previous stage. Lateral hairs long, dirty whitish mixed with a few black ones. Dorsal tufts as before except that those on joints 5-8 are now large, square, brown ones, mixed at the sides with white plumed hairs; the tuft on joint 12 still remaining black as previously and contrasting with the others.

Cocoon composed of hair and silk.

Mature larvae on Hickory (*Carya*) at Rhinebeck, N. Y. June 6, 1887 and young ones on oak (*Quercus*) Aug. 9, 1887. My description agrees approximately with Smith and Abbot's figure; but this figure can hardly be very accurate as remarked by Prof. Riley (Proc. ent. soc. Wash. i, 88.). The brief description of the larva of "*Parorgyia clintonii*" by Mr. Coquillett (Can. ent. xii, 45) also agrees with my notes, except that the author remarks that the retractile tubercles are "reddish."

The moths bred from the larvae here described were of the form *basiflava* Pack.

PARORGYIA ACHATINA Abbot and Smith.

1797—A and S. Lep. ins. Ga., ii, pl. 77.
parallela Grote and Robinson.

1866—G. and R. Proc. ent. soc. Phil., vi, 5.
1872—Lintner, 26th rept. N. Y. state cab.

n. hist. 129.

1887—Seifert, Ent. amer. iii, 93

1890—Packard, 5th rept. U. S. ent. comm. 135.

var. OBLIQUATA Grote and Robinson.

1866—G. and R. Proc. ent. soc. Phil., vi, 4.

According to the observations of Mr. Seifert, this larva has eight stages, while Dr. Packard gives it but five.* Mr. Seifert's larvae did not hibernate, which is unusual for this latitude. I believe this species usually hibernates in the fourth and fifth larval stages.

Larva stage III.^o(?)—Head black, shining, mouth parts paler, sutures depressed; width 1.34 mm. Body nearly black, a little mottled with whitish at the sides. Subdorsal warts on joint 2 large, bearing a few plumed black hairs. From warts i and ii on joints 5 and 12 arises a square black tuft of plumed hairs. The other warts bear pale, sordid, whitish hairs; but from warts i and ii on joints 6-8

* Neither of these authors have given any measurements of the width of head, which would have enabled me to compare the stages observed by me directly with their descriptions. They have given measurements of the length of the larva, data which seem to me very variable and unsatisfactory. Nevertheless, the measurements of Mr. Seifert follow a series in geometrical progression fairly well, and, to judge Dr. Packard's work by Mr. Seifert's, using the length of larva as means of comparison, I conclude that Dr. Packard has failed to observe stages iv, vi and vii, as recorded by Mr. Seifert. Below, I give, comparatively, a calculated series and the lengths of larva as found by these gentlemen.

Calculated series, ratio 7-10: 3.1, 4.5, 6.4, 9.1, 13.0, 18.6, 26.6, 38 mm.

Mr. Seifert's measurements: 3.9, 5.1, 6.5, 9.0, 13, 19 25, 26-38 mm.

Dr. Packard's measurements: 2.5, 4.5, 7, —, 12-14, —, —, 35 mm.

It seems evident that Dr. Packard must have missed at least one stage; for it is not possible to make his measurements fit a calculated series. However, such is the uncertainty of these measurements, that it can be done by supposing that the larvae have sometimes only six stages, and that Dr. Packard missed stage v; e. g.,

Calculated series, ratio 6-10: 2.7, 4.5, 7.6, 13, 21, 35 mm.

Dr. Packard's figures: 2.5, 4.5, 7, 12-14, —, 35 mm.

they are gray, forming slight dorsal tufts. On joints 10 and 11 a medio-dorsal whitish retractile tubercles.

Stage IV. (?)—Width of head 1.65 mm. As before, but the hair pencils from joint 2 are more distinct and there is abundant gray hair from the dorsal warts of joints 3, 4, 6, 7 and 8. Some larvae hibernate in this stage.

Stage V. (?)—Head black, labrum and antennae whitish; width 2 mm. Dorsum covered by feathery gray hairs; but the whitish retractile tubercles are exposed. Black hair pencils on joint 2 and square tufts on joints 5 and 12 as before.

This is the hibernating stage.

Food plants.—Oak (*Quercus*), Hickory (*Carya*) and wild cherry (*Prunus serotina*).

Parorgyia achatina larva differs from that of *P. leucophaea* in lacking the pair of black hair pencils which are present in the latter on joint 13.

The synonymy given above for the two species of *Parorgyia* is the same as that given by Dr. Packard (5th rept. U. S. ent. comm. pp. 135-138) except that I regard *obliquata* as the form of *achatina* in which the longitudinal black bar is absent (see Seifert, Ent. Amer. iii, 96) and not as a synonym of *leucophaea*. Further, I regard *P. cinnamomea* G. and R. and *P. plagiata* Walk. as distinct species. In confirmation of this view, I have found a single larva on the hop-hornbeam in Ulster Co., N. Y., June 5, 1887, which differed from both those described above. It had two pair of black pencils and four tufts mixed with very feathery white hairs besides eight smaller dorsal tufts and a series of small lateral pencils. The retractile tubercles were red. Head black, body whitish, hair whitish gray. I was unable to obtain a moth from the larva, and have not met with it since. It seems likely that it may have been *Parorgyia cinnamomea*.

LEBENA OVILLA Grote.

I have observed two stages previous to the last one which has been described by Dr.

Packard (American Naturalist, xviii, 726). In these stages the larva is largely green and rests on the back of a leaf; in the last stage it is gray and hides by day in crevices in the bark. Its colors are well adapted to the surroundings which its habits lead it to choose at different periods of its life.

Stage II. (?)—Head pale yellowish, mouth darker; width 0.45 mm. Body light green, the wart i on joint 7 blackish brown with a small brown dorsal patch and faint, broad, greenish white dorsal band. Other warts pale; hairs mostly pale, a few stiff, dark ones. Length of larva about 4 mm.

Stage III.—Much the same. Width of head 0.60 mm.

Stage IV. (?)—Width of head 0.85 mm. Much as in the next stage, though still largely green. Markings brownish, clouded; dorsal line scarcely continuous. Warts pale, except wart i on joint 7 which is black.

Stage VI. ? (Last stage).—Head slightly bilobed, about as wide as high, full, well rounded; ground color white, shining, marked with dense black mottlings, forming a black patch over the vertex of each lobe, and largely covering the clypeus, leaving the sutures white; width 1.5 mm. Body flattened, projecting subventrally, abdominal feet present on joints 8-10 and 13 only. Three rows of warts on every joint, row i subdorsal, central; ii superstigmatal, anterior; iii substigmatal on a projecting base and iv smaller, on joints 3-11 subventrally. Hair fine, radiating, not abundant, but thickest and longest from the warts of row iii. Color sordid white with a black dorsal line and several irregular and confused, crinkled, blackish lines along the sides, giving a dark gray appearance. On joints 2-4, 7 and 11-12 the dark color predominates dorsally, forming diffuse, clouded patches, through which the dorsal line is less distinctly defined by white than elsewhere. Thoracic feet brownish. Warts all pale, some of row i tinged with black. Hair black and white mixed. Venter sordid white.

Cocoon.—Composed of little bits of leaf or other material. The larva builds up two parallel walls and unites them at the top. Cocoon elliptical, flat at base, size $7 \times 2\frac{1}{2}$ mm. The anterior end is a little higher and more pointed than the posterior.

Larvae on *Quercus macrocarpa* at Plattsburgh, N. Y.

ENTOMOLOGICAL NOTES.

A recent number of the Proc. Boston soc. nat. hist. contains a critical study and revision of the New England species of Spharagemon by Mr. A. P. Morse. The article is based on a large amount of material for the most part personally collected in various parts of the territory considered and upon examination of the type specimens whenever practicable, and is illustrated with drawings of the principal structural characteristics presented by several species of the genus. Three species are recognized as occurring in New England; another from Staten Id. will probably be found in Connecticut. The latter is described as new (*S. oculatum*) and has probably been confused with *S. col-*

lare. Of the former, one (*S. saxatile*) is new, having been hitherto confused with the remaining two (*S. aequale* and *bolli*). *S. balteatum* is reduced to a synonym, and the New England form of *aequale* is further distinguished by a trinomial (*scudderi*) for reasons which our space withholds. The cut, on a smaller scale, and its explanation are given herewith.

We are glad to commend and call the attention of entomologists to the author's practice of examining an abundance of material and distributing examples as one likely to materially advance the science by reducing errors and synonyms to a minimum.

The death is announced of Edward Norton at the age of 70, at his home in Farmington, Conn. Mr. Norton was one of the first naturalists of this country to devote himself to the exclusive study of a single family of Hymenoptera, choosing the Tenthredinidae. It is many years, however, since he took an active part in entomological pursuits. It may not be known to many that he is said to have been the first importer of Guernsey cattle to this country and that he established the first creamery in New England.

In an extended notice of the first volume of Kolbe's new Introduction to Entomology in a recent number of the Entomologische nachrichten, Verhoeff declares it to be for entomologists the most important literary work of the last decade.

Under the insufficient and over modest title "On certain grass-eating insects," Mr. E. P. Felt of Cornell University publishes a synopsis of the species of Crambus found about Ithaca, N. Y., treating the subject both systematically and economically, with exceptionally full accounts of the life histories of those little known moths and abundant and very varied illustrations. 26 species are included. It is an excellent exposition of the Cornell method.

Mr. C. H. Tyler Townsend has again changed his address to Las Cruces, N. Mex.

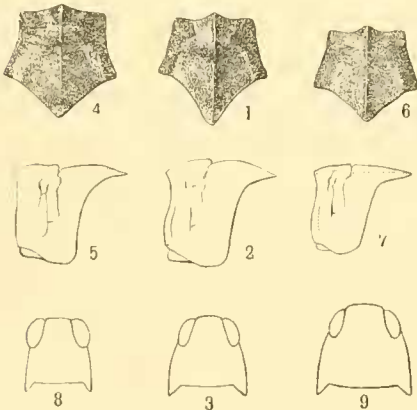


Fig. 1, 2, 3, *S. aequale scudderi*. Fig. 4, 5, *S. saxatile*. Fig. 6, 7, *S. bolli*. Fig. 8, *S. oculatum*. Fig. 9, *S. collare*. 2 diameters.